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(54) **A tilting mechanism for a chair**

Wippvorrichtung für einen Stuhl

Dispositif de basculement pour une chaise

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(56) References cited:
**DE-A- 2 036 781 GB-A- 1 202 387
US-A- 2 529 638 US-A- 5 186 424**

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Description

The present device relates to a tilting mechanism which is placed between a chair seat and a chair support.

A number of such tilting mechanisms are previously known, and in the German patent 3439917 a tilting mechanism is shown and described wherein the chair seat, on the underside thereof, on each of the longitudinal sides, is equipped with a wave-shaped or serrated, curved profile member which interacts with a correspondingly shaped member located on the support of the chair. A solution of this kind is rather unsuitable for stacking chairs or office chairs, since the members which form engagement with one another require space in the longitudinal direction of the chair.

It is therefore the aim of the present invention to provide solutions for a tilting mechanism which are placed between a chair seat and a chair support, and which have a considerably smaller extension in the longitudinal direction of the chair than the solution disclosed in the aforementioned German patent.

The tilting mechanism mentioned by way of introduction is characterised, according to the invention, in that it consists of a bearing plate which curves upwards and which on its underside is supported by a stiffening brace, said bearing plate being rigidly connected to the support of the chair and in such a way that the chair seat can be tilted on the upwardly curved upper side of the bearing plate in the longitudinal direction thereof, and the underside of the chair seat is mechanically connected to the stiffening brace by means of elastically yielding means, e.g., helical springs or rubber chocks placed either on respective arms which project from the stiffening brace on each long side of the bearing plate, or on lugs which are fixed to the chair support.

The bearing plate may either be connected to the support of the chair via the stiffening brace, or be attached on the underside thereof directly to the support of the chair.

The invention shall now be described in more detail with reference to the attached drawings.

Fig. 1 illustrates a stacking chair equipped with a tilting mechanism, according to the invention.

Fig. 2 illustrates an office chair equipped with a tilting mechanism, according to the invention.

Fig. 3 is a front view of a first embodiment of the device, according to the invention.

Fig. 4 is a side view of the embodiment illustrated in Fig. 3.

Fig. 5 is a front view of a second embodiment of the device, according to the invention.

Fig. 6 is a side view of the embodiment illustrated in Fig. 5.

Fig. 7 shows in frontal perspective a modification of the embodiment illustrated in Figs. 3 and 4.

Fig. 8 shows in frontal perspective, from the underside of the embodiment illustrated in Fig. 7, according to

the invention.

Fig. 9 shows a detail of the embodiment illustrated in Figs. 3, 4, 7 and 8.

Fig. 10 shows the cross-section along the line X-X in Fig. 9.

In Figs. 1a, b, c, d and e, a stacking chair 1 is illustrated which has a back 2 and a seat 3 and has legs 4, 5 which extend forwards and backwards respectively and run across the chair through a tilting mechanism 6. As is illustrated in Figs. 1a, 1b, 1c and 1d, the chair 1 will be capable of being tilted, for instance, between the extreme positions shown in Figs. 1a and 1c. Owing to the fact that the tilting mechanism 6 is of a small dimension downwards from the underside of the chair seat and, moreover, extends little in the longitudinal direction of the chair, the illustrated chair, equipped with a tilting mechanism according to the invention, is especially suitable as a stackable chair.

Fig. 2 illustrates a variant of the chair in Fig. 1, in the form of an office chair 7 designed to have a back 8, a seat 9 and a tilting mechanism 10. The tilting mechanism has an attachment piece 11 which forms a connection with, for instance, a pneumatic spring 12 of a type that is known per se, and which at the bottom terminates in a base cross 13 equipped with castors 14. The embodiment in Fig. 1 will now be described in more detail with reference to Figs. 3 and 4. The chair seat 3 is connected to arms 15, 16 on a stiffening brace 17 via helical springs 18, 19. The stiffening brace 17 is firmly secured to a bearing plate 20 which curves upwards. By means of the springs 18, 19, the seat is drawn down into contact against the bearing plate 20, and by tilting the seat 3 in relation to the stationary bearing plate 20, the springs 18, 19 will ensure that the seat 3 is maintained essentially unmoveable in the longitudinal direction of the chair, even though it rocks on the upper side of the bearing plate in the longitudinal direction thereof. The upper surface of the bearing plate may to advantage be provided with a friction facing 21, e.g., of rubber. The stiffening brace is provided at the bottom with an attachment piece 11 which forms a connection with the pneumatic spring 12, as is shown in Fig. 2.

Fig. 5 is an illustration of a modification of the embodiment in Figs. 3 and 4, and in accordance with what is made evident in Fig. 1. Support lugs 22, 23 are attached to the front legs 4 of the chair, and the bearing plate 24 which supports the seat 3 is upwardly curved and on the underside thereof is firmly secured to the horizontal portion of the chair legs, the foremost part 4' of which being evident in Fig. 5. Said horizontal portions may, in addition or alternatively, be attached to the stiffening brace 25 which supports the bearing plate 24. The upper surface of the bearing plate 24 may to advantage be provided with a friction facing 26, e.g., of rubber, corresponding to the facing 21 in Figs. 3 and 4. The mode of operation of the bearing plate is in other respects as explained in connection with Figs. 3 and 4.

Figs. 7 and 8 show the device according to Figs. 3

and 4 in perspective from in front and from below, and where said springs 18, 19 have been replaced by rubber chocks 27 and 28.

Figs. 9 and 10 show how a release lever 29 can be attached to a support rib 30 by means of a screw connection 31. The part of the lever 29 which lies immediately above the releaser 33 is denoted by means of the reference numeral 34. By pivoting the arm 29 about the rotary connection which is formed by the screw 32 and the support rib 30, the releaser 33 will be activated, such that the chair seat can be moved freely upwards and downwards, until the release lever 34 is released, whereupon the pneumatic spring 12 will lock in the chosen position.

Claims

1. A tilting mechanism which is placed between a chair seat (3) and a chair support (4,5;11,12), characterised in that it consists of a bearing plate (20,21;24,26) which curves upwards and which on the underside thereof is supported by means of a stiffening brace (17;25), said bearing plate (20,21;24,26) being rigidly attached to the support of the chair and in such a way that the chair seat (3) can be tilted on the upwardly curved upper side of the bearing plate in the longitudinal direction thereof, and the underside of the chair seat is mechanically attached to the stiffening brace (17;25) by means of elastically yielding means, e.g., helical springs (18,19) or rubber chocks (27;28) placed either on respective arms (15;16) which project laterally from the stiffening brace (17;25) on each long side of the bearing plate, or on lugs (22,23) which are secured to the chair support.
2. A tilting mechanism as disclosed in Claim 1, characterised in that the bearing plate is connected to the support of the chair via the stiffening brace.
3. A tilting mechanism as disclosed in Claim 1, characterised in that the bearing plate is secured on the underside thereof directly to the support of the chair.

Patentansprüche

1. Wippvorrichtung, die zwischen einem Stuhlsitz (3) und einem Stuhlaflager (4, 5; 11, 12) plaziert ist, dadurch gekennzeichnet, daß sie aus einer Lagerplatte (20, 21; 24, 26) besteht, die nach oben gerundet und an ihrer Unterseite mittels einer Versteifungsstrebe (17; 25) gestützt ist, wobei die Lagerplatte (20, 21; 24, 26) an dem Stuhlaflager fest und dergestalt angebracht ist, daß der Stuhlsitz (3) auf der nach oben gerundeten Oberseite der Lagerplatte in deren Längsrichtung gekippt werden kann, und die Unterseite des Stuhlsitzes ist mittels

elastisch nachgebender Mittel, wie beispielsweise Schraubenfedern (18, 19) oder Gummiklötzchen, die entweder auf jeweiligen, von der Versteifungsstrebe auf jeder Längsseite der Lagerplatte seitlich wegstehenden Armen (15; 16) oder auf an dem Stuhlaflager befestigten Nasen (22, 23) plaziert sind, an der Versteifungsstrebe (17; 25) mechanisch angebracht.

2. Wippvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Lagerplatte über die Versteifungsstrebe mit dem Stuhlaflager verbunden ist.
3. Wippvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Lagerplatte an ihrer Unterseite direkt mit dem Stuhlaflager verbunden ist.

Revendications

1. Mécanisme d'inclinaison qui est placé entre une assise (3) de chaise et un support de chaise (4,5;11,12), caractérisé en ce qu'il comprend une plaque d'appui (20,21;24,26) qui est courbée vers le haut et qui est supportée, au niveau de son côté inférieur, au moyen d'une armature de renfort (17;25), ladite plaque d'appui (20,21;24,26) étant attachée de manière rigide au support de la chaise et de telle manière que l'assise (3) de la chaise peut être inclinée sur le côté supérieur courbé vers le haut de la plaque d'appui selon la direction longitudinale de celle-ci, et le côté inférieur de l'assise de chaise est attaché mécaniquement à l'armature de renfort (17;25) par l'intermédiaire de moyens élastiquement déformables, par exemple des ressorts hélicoïdaux (18,19) ou des cales en caoutchouc (27;28) placés soit sur des bras respectifs (15;16) qui sont en saillie latéralement depuis l'armature de renfort (17;25) sur chaque côté long de la plaque d'appui, ou sur des pattes qui sont fixées au support de chaise.
2. Mécanisme selon la revendication 1, caractérisé en ce que la plaque d'appui est reliée au support de la chaise par l'intermédiaire de l'armature de renfort.
3. Mécanisme selon la revendication 1, caractérisé en ce que la plaque d'appui est fixée au niveau du côté inférieur de celle-ci directement au support de la chaise.

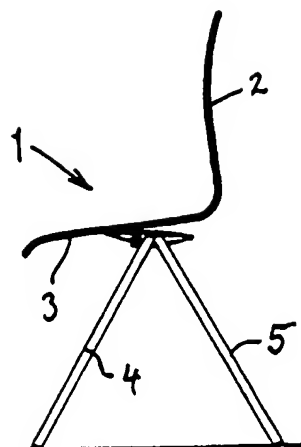


FIG. 1A

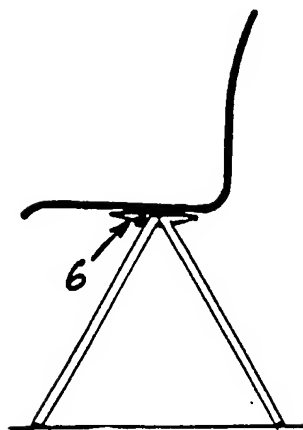


FIG. 1B



FIG. 1c

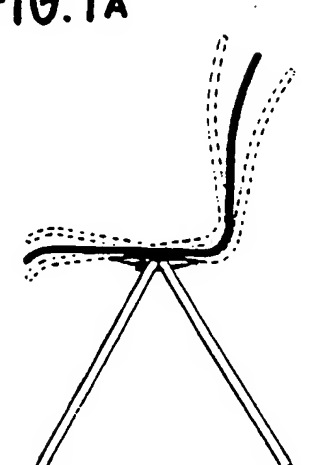


FIG. 1D

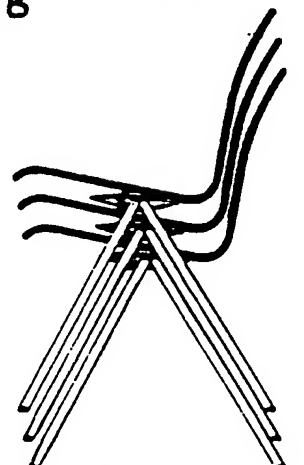


FIG. 1E

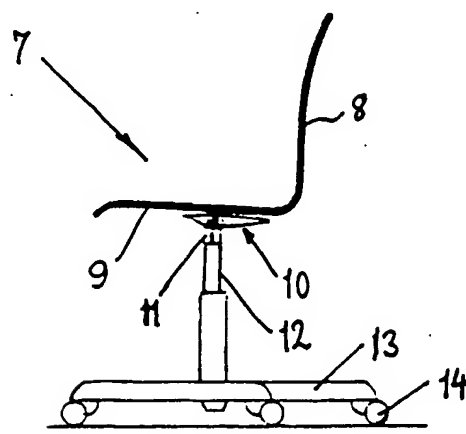
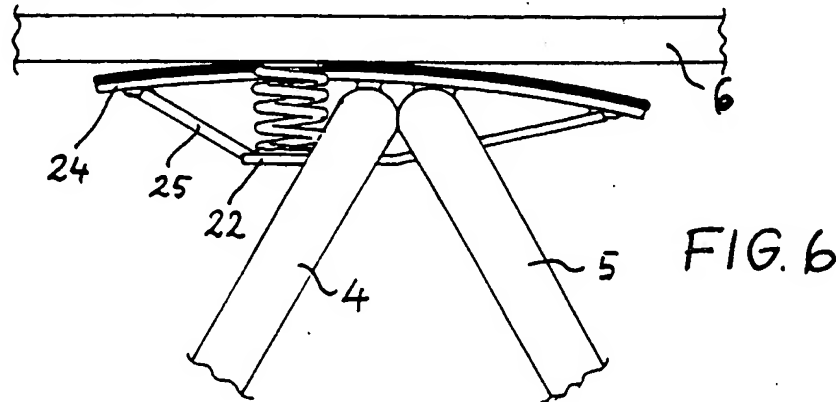
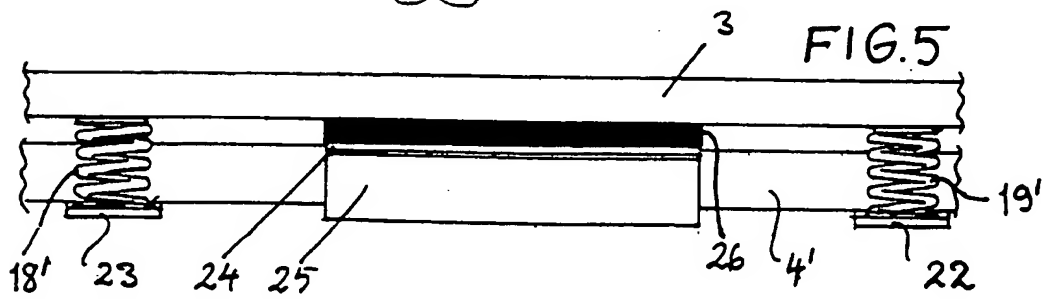
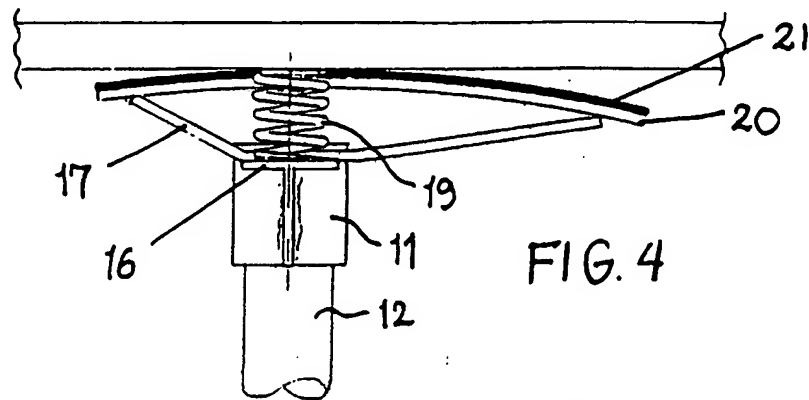
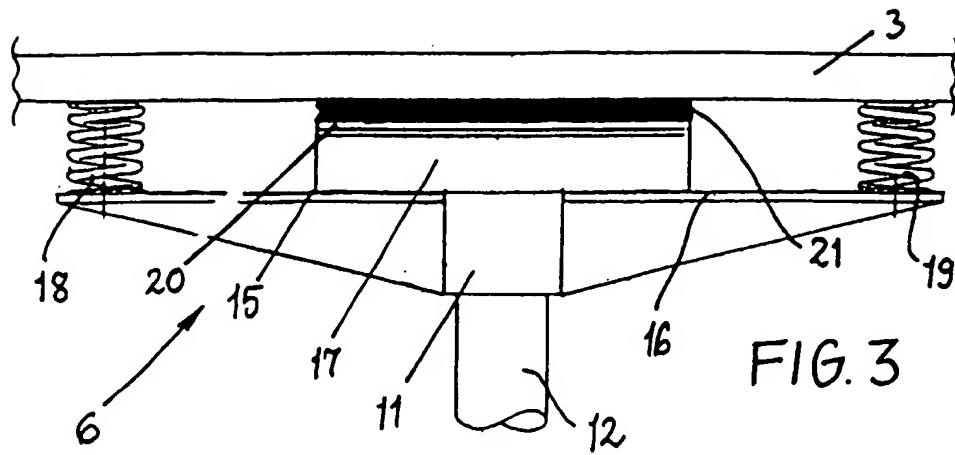


FIG. 2



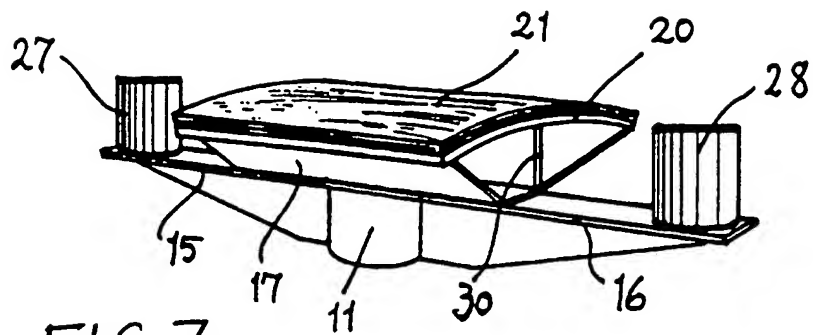


FIG. 7

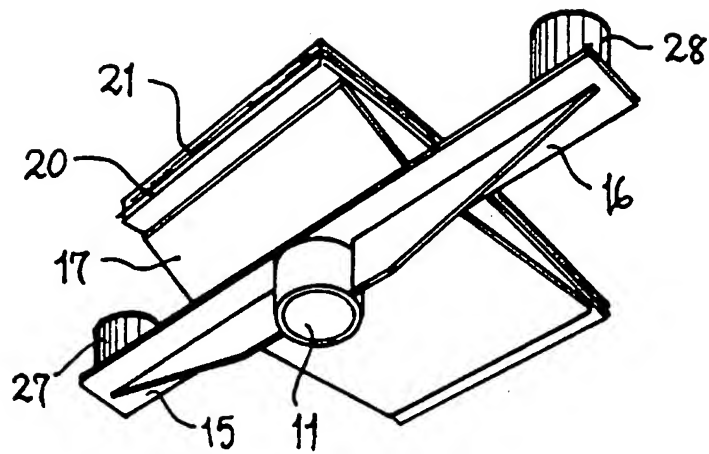


FIG. 8

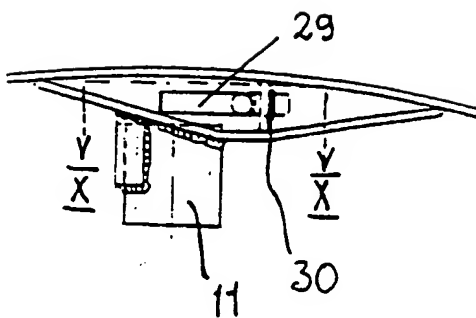


FIG. 9

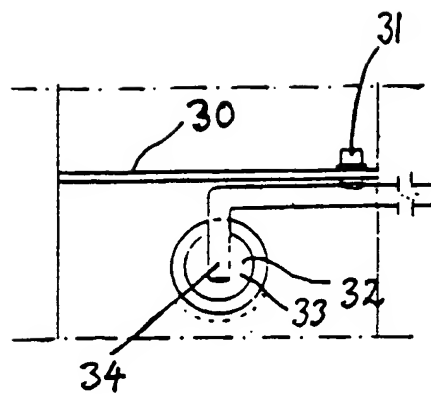


FIG. 10

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